AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A cracking tube comprising:

a first layer on an interior surface of the tube; and

a second material surrounding the first layer ~~lining~~,

wherein the first layer is an iron aluminide alloy with transition metal oxides in an amount effective to provide ~~having~~ a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of the second material over the temperature range of ambient to about 1000°C.

2. (Original) The cracking tube of claim 1, wherein the iron aluminide alloy is a sintered iron aluminide alloy or a composite of iron aluminide alloy.

3. (Original) The cracking tube of claim 1, wherein the second material is INCO 803 or HP steels.

4. (Currently Amended) ~~The cracking tube of claim 1~~ A cracking tube comprising:

a first layer on an interior surface of the tube; and

a second material surrounding the first layer,

wherein the first layer is an iron aluminide alloy,

wherein the iron aluminide alloy includes at least 2 vol.% transition metal oxides selected from ~~alumina, yttria, ceria, zirconia,~~ oxides of aluminum, yttrium, cerium, zirconium or lanthanum.

5. (Original) The cracking tube of claim 4, wherein the iron aluminide includes at least 14 wt.% aluminum.

6. (Original) The cracking tube of claim 4, wherein the iron aluminide alloy includes an additive present in an amount which improves metallurgical bonding between the oxide filler and the iron aluminide alloy, the additive comprising at least one refractory carbide.

7. (Currently Amended) ~~The cracking tube of claim 1~~ A cracking tube comprising:

a first layer on an interior surface of the tube; and

a second material surrounding the first layer,

wherein the first layer is an iron aluminide alloy, wherein the iron aluminide alloy comprises:

14-32 wt.% Al;

10-14 vol. % transition metal oxides;

0.003 to 0.020 wt.% B;

0.2 to 2.0 wt.% Mo;

0.05 to 1.0 wt.% Zr;

0.2 to 2.0 wt.%Ti;

0.10 to 1.0 wt.% La;

0.05 to 0.2 wt.% C;

balance Fe; and

optionally, ≤ 1 wt.% Cr.

8. (Original) The cracking tube of claim 1, wherein the first layer comprises an extruded layer on the inside of the tube.

9. (Currently Amended) ~~The cracking tube of claim 1~~ A cracking tube comprising:

a first layer on an interior surface of the tube; and

a second material surrounding the first layer,

wherein the first layer is an iron aluminide alloy,

wherein the alloy is in the form of a sintered nanocrystalline intermetallic powder.

10. (Original) A method of reforming a hydrocarbon feed in the cracking tube of claim 1, comprising passing of a mixture of steam and the hydrocarbon feed through the cracking tube while heating the tube to at least 800°C.

11. (Currently Amended) A method of manufacturing ~~the cracking tube of claim 1~~ a cracking tube comprising: a first layer on an interior surface of the tube; and a second material surrounding the first layer, wherein the first layer is an iron aluminide alloy, wherein the method comprises ~~comprising~~ the steps of:

forming the first layer from a powder of 14-32 wt. % Al, 10-14 vol. % transition metal oxides, 0.003 to 0.020 wt.% B, 0.2 to 2.0 wt.% Mo, 0.05 to 1.0 wt.% Zr, 0.2 to 2.0 wt.%Ti, 0.10 to 1.0 wt.% La, 0.05 to 0.2 wt.% C, balance including Fe, and optionally ≤ 1 wt.% Cr, the powder having been prepared by mechanical alloying, gas atomization, or water atomization techniques.

12. (Currently Amended) The method of claim 11, wherein transition metal oxides are oxides of aluminum, ~~yttria, ceria, zirconia,~~ yttrium, cerium, zirconium or lanthanum.

13. (Original) The method of claim 12, wherein transition metal oxides are Al_2O_3, Y_2O_3, CeO, Zr_2O_3, or LaO.

14. (Original) The method of claim 11, wherein the first layer is formed by co-extrusion with the second material of the cracking tube, the co-extrusion carried out at a minimum of 800°C by using a cold isostatically pressed (CIP) billet or a hot isostatically pressed (HIP) billet.

15. (Original) The method of claim 14, wherein the billet formed by cold isostatic pressing is obtained by reaction synthesis or mechanical alloying of iron aluminide with mixed oxides.

16. (Original) The method of claim 11, wherein the second material of the cracking tube is an INCO 803 steel, a HP steel, or one of the Fe-, Cr-, or Ni-based alloys with a minimum of 10 wt.% of Cr or Ni.

17. (Original) The method of claim 11, wherein the first layer is formed by thermal spraying techniques.

18. (Original) The method of claim 17, wherein thermal spraying techniques are plasma spraying or high velocity oxy-fuel spraying.

19. (Original) The method of claim 11, wherein the first layer comprises a cladding.

20. (Currently Amended) The cracking tube of claim 1, further comprising:

an intermediate layer disposed between the first layer and the second material,

wherein the intermediate layer has a coefficient of thermal expansion ~~between~~ similar to the coefficients of thermal expansion of the first layer and the second material.

21. (Currently Amended) A method of reducing coking and carburization in a cracking tube having a metallurgically modified surface on the inner diameter surface thereof and the cracking tube is used in an environment in which

hydrocarbon feedstock is thermally and/or catalytically converted to hydrocarbon products, comprising:

heating the cracking tube to a first temperature at which cracking of hydrocarbon feedstock occurs;

flowing hydrocarbon through the cracking tube; and

producing an effluent containing a desired hydrocarbon product,

wherein the metallurgically modified surface is an iron aluminide alloy with transition metal oxides in an amount effective to provide ~~having~~ a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of a second material of the cracking tube over the temperature range of ambient to about 1000°C, and wherein the modified surface is substantially coke and carburization-free after a period of time in which a similar cracking tube without the metallurgically modified surface of iron aluminide alloy exhibits coking and carburization.

22. (Currently Amended) ~~The method of claim 21,~~ A method of reducing coking and carburization in a cracking tube having a metallurgically modified surface on the inner diameter surface thereof and the cracking tube is used in an environment in which hydrocarbon feedstock is thermally and/or catalytically converted to hydrocarbon products, comprising:

heating the cracking tube to a first temperature at which cracking of hydrocarbon feedstock occurs;

flowing hydrocarbon through the cracking tube; and

producing an effluent containing a desired hydrocarbon product,

wherein the metallurgically modified surface is an iron aluminide alloy, wherein the iron aluminide alloy comprises:

14-32 wt.% Al;

10-14 vol. % transition metal oxides;

0.003 to 0.020 wt.% B;

0.2 to 2.0 wt.% Mo;

0.05 to 1.0 wt.% Zr;

0.2 to 2.0 wt.%Ti;

0.10 to 1.0 wt.% La;

0.05 to 0.2 wt.% C;

balance Fe; and

optionally, $\leq$ 1 wt.% Cr.

23. (Currently Amended) In a process of producing hydrocarbon products from feedstock utilizing a cracking tube, the improvement comprising passing the feedstock through a cracking tube having a metallurgically modified surface of iron aluminide alloy with transition metal oxides in an amount effective to provide a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of an outer material surrounding the metallurgically modified surface of the cracking tube over the temperature range of ambient to about 1000°C, wherein the iron aluminide alloy with the transition metal oxides is disposed on ~~the~~ an inner surface of the cracking tube such that feedstock is in fluid communication with the metallurgically modified surface.

24. (Canceled)

25. (Currently Amended) ~~In the process of claim 23~~ In a process of producing hydrocarbon products from feedstock utilizing a cracking tube, the improvement comprising passing the feedstock through a cracking tube having a metallurgically modified surface of iron aluminide alloy disposed on an inner surface of the cracking tube such that feedstock is in fluid communication with the metallurgically modified surface, wherein the iron aluminide alloy comprises:

14-32 wt.% Al;

10-14 vol. % transition metal oxides;

0.003 to 0.020 wt.% B;

0.2 to 2.0 wt.% Mo;

0.05 to 1.0 wt.% Zr;

0.2 to 2.0 wt.%Ti;

0.10 to 1.0 wt.% La;

0.05 to 0.2 wt.% C;

balance Fe; and

optionally, $\leq$ 1 wt.% Cr.

26. (Original) In the process of claim 23, wherein the period of time between successive decoking operations is extended by at least 10 percent as compared to the time between successive decoking operations in a substantially similar cracking tube that does not have a metallurgically modified surface of iron

aluminide alloy disposed on the inner surface and in fluid communication with the feedstock.

27. (Currently Amended) In a cracking tube, the improvement comprising:

a metallurgically modified surface of iron aluminide alloy with transition metal oxides disposed on the inner surface of the cracking tube,

wherein the feedstock is in fluid communication with the metallurgically modified surface and wherein the coefficient of thermal expansion of the iron aluminide alloy is lowered by the transition metal oxides to be ~~is~~ substantially the same as the coefficient of thermal expansion of a second material of the cracking tube over the temperature range of ambient to about 1000°C, the second material being an outer material for the cracking tube.

28. (Currently Amended) In the cracking tube of claim 27, the improvement further comprising:

an intermediate layer disposed between the iron aluminide alloy and the second material, the intermediate layer having a coefficient of thermal expansion ~~between~~ similar to that of the iron aluminide alloy with the transition metal oxides and the second material.

29. (Currently Amended) ~~In the cracking tube of claim 27~~ In a cracking tube, the improvement comprising:

a metallurgically modified surface of iron aluminide alloy disposed on an inner surface of the cracking tube, wherein the iron aluminide alloy comprises:

14-32 wt.% Al;

10-14 vol. % transition metal oxides;

0.003 to 0.020 wt.% B;

0.2 to 2.0 wt.% Mo;

0.05 to 1.0 wt.% Zr;

0.2 to 2.0 wt.%Ti;

0.10 to 1.0 wt.% La;

0.05 to 0.2 wt.% C;

balance Fe; and

optionally, $\leq$ 1 wt.% Cr.